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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/767,524

Filing Date: January 29, 2004

Appellant(s): PATRIZIO ET AL.

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Clifton L. Anderson  
(Reg. No. 30,989)  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/14/2008 appealing from the Office action  
mailed 08/21/2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

7,107,191	Stweart et al.	9-2006
7,228,458	Kesavan	6-2007

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(c), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart et al. (US Patent No. 7,107,191), in view of Kesavan (US Patent No. 7,228,458).

As per Claims 1 and 10, Stewart et al. teaches a computer system and computer implemented method (Fig. 1-2) comprising:

a simulator (Fig. 1-2) including:

a virtual-cluster generator for generating a first virtual cluster in a virtual pre-failure configuration corresponding to a real pre-failure configuration of said real computer cluster (Col. 3 lines 52-67, Col. 4 lines 1-30).

Stewart et al. fails to teach explicitly a virtual-failure event selector providing for selecting a virtual- failure event corresponding to a real-failure event that applies to a real computer cluster, and

a virtual-cluster generator for, in response to selection of said virtual-failure event, generating a second virtual cluster in a virtual post-failure configuration corresponding to a real post-failure configuration that said real computer cluster would assume in response to said real-failure event.

Kesavan teaches a virtual-failure event selector providing for selecting a virtual- failure event corresponding to a real-failure event that applies to a real computer cluster (Fig 3-4, Col. 2 lines 54-67, Col. 3lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6lines 40-50, Col. 7 lines 11-24), and

a virtual-cluster generator for, in response to selection of said virtual-failure event, generating a second virtual cluster in a virtual post-failure configuration corresponding to a real post-failure configuration that said real computer cluster would assume in response to said real-failure event (Col. 7 lines 11-24, Fig 3-4, Col. 2 lines 54-67, Col. 3lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6 lines 40-50,).

Stewart et al. and Kesavan are analogous art because they are both related to simulation.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to have included the virtual-failure event selector of Kesavan, in the method of modular architecture for optimizing a configuration of computer system of Stewart et al. because a virtual-failure event selector is well known process in a method for optimizing a configuration of computer system. Kesavan teaches advantageous of system that pretest storage device and their related components in a complicated clustering system for cluster compatibility without requiring that the tests be executed on a fully functioning computing cluster (Col. 1 lines 18-27)

As per Claim 2, Stewart et al. teaches wherein, in said real pre-failure configuration, said real computer cluster runs a software application on a first computer of said real computer cluster and not on a second computer of said real computer cluster (Col. 16 lines 48-52, Fig. 4), and wherein, in said real post-failure configuration, said real computer cluster runs said application on said second computer but not on said first computer (Col. 16 lines 48-52, Fig. 4).

As per Claim 3, Stewart et al. teaches said real computer cluster (Fig. 1-4) including profiling software (Fig. 2) for providing a descriptive profile of said real computer cluster, said virtual-cluster generator generating said virtual cluster in said pre-failure configuration using said descriptive profile (Col. 3 lines 51-67, Col. 4 lines 1-30, Col. 5 lines 1-40).

As per Claim 4, Stewart et al. teaches wherein said real computer cluster is connected to said simulator for providing said descriptive profile thereto (Fig. 1-4, Col. 3 lines 52-67, Col. 4 lines 1-30).

As per Claim 5, Stewart et al. teaches an evaluator for evaluating said virtual cluster in its post-failure configuration (Fig. 1-4, Col. 8 lines 31-39).

As per Claim 6, Stewart et al. teaches a test sequencer (Fig. 1-4, Col. 12 lines 19-62).

Stewart et al. fails to teach explicitly selecting different virtual-failure events to be applied to said first virtual cluster in said pre-failure configuration so as to result in different post-failure configurations of said virtual cluster.

Kesavan teaches selecting different virtual-failure events to be applied to said first virtual cluster in said pre-failure configuration so as to result in different post-failure configurations of said virtual cluster (Fig 3-4, Col. 2 lines 54-67, Col. 3 lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6 lines 40-50, Col. 7 lines 11-24).

As per Claim 7, Stewart et al. teaches a statistical analyzer for statistically analyzing evaluations of said different configurations of said virtual cluster (Fig. 1-4, Col. 8 lines 31-39).

Stewart et al. fails to teach explicitly different post-failure configurations.

Kesavan teaches different post-failure configurations (Fig 3-4, Col. 2 lines 54-67, Col. 3 lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6 lines 40-50, Col. 7 lines 11-24).

As per Claim 8, Stewart et al. teaches wherein said test sequencer automatically tests different configurations, said statistical analyzer providing a determination of optimum pre-failure configuration by statistically analyzing evaluations of the resulting the configurations (Fig. 1-4, Col. 8 lines 31-39, Col. 12 lines 19-62).

Stewart et al. fails to teach explicitly different configurations of said virtual cluster against different failure events.

Kesavan teaches different post-failure configurations (Fig 3-4, Col. 2 lines 54-67, Col. 3lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6lines 40-50, Col. 7 lines 11-24).

As per Claim 9, Stewart et al. teaches wherein said simulator is connected to said real computer cluster for providing said determination thereto, said real computer cluster automatically reconfiguring itself as a function of said determination (Fig. 1-4, Col. 8 lines 5-30, Col. 12 lines 62-67).

As per Claim 11 and 13, Stewart et al. teaches wherein steps a, b, and c are iterated for different configurations of said real computer cluster, said method further comprising providing a recommended configuration for said real computer cluster (Fig. 1-4, Col. 3 lines 52-65, Col. 5 lines 18-28, Col. 8 lines 5-53, Col. 12 lines 19-67).

Stewart et al. fails to teach explicitly different sets of said predetermined failure types  
Kesavan teaches different sets of said predetermined failure types (Fig 3-4, Col. 2 lines 54-67, Col. 3lines 1-3, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 5 lines 57-67, col. 6 lines 1-16, Col. 6lines 40-50, Col. 7 lines 11-24).

As per Claim 12, Stewart et al. teaches gathering profile information about said real cluster in said first configuration, wherein said first virtual computer cluster is generated using said profile information (Fig. 3, Col. 4 lines 10-30, Col. 5 lines 1-40).

As per Claim 14, Stewart et al. teaches transmitting said recommendation to said real computer cluster; and implementing said recommended configuration on said real computer cluster (Fig. 1-4).

As per Claim 15 and 16, Stewart et al. fails to teach explicitly wherein said type of failure relates to a failure of a network interface or a hard disk interface.

Kesavan teaches wherein said type of failure relates to a failure of a network interface or a hard disk interface (Col. 5 lines 12-17, Col. 5 lines 56-67, Col. 6 lines 1-16).

#### **(10) Response to Argument**

(A). Appellants have argued in Group I: CLAIMS 1-10 that:

[10] However, Kesavan does not teach or suggest: 1) a virtual-cluster generator, 2) a virtual-failure event, 3) a second (or a first) virtual cluster, or 4) a virtual post-failure configuration.<sup>[1]</sup> A failure to disclose even one of these elements (that are admittedly not disclosed by Stewart) would be sufficient justification for reversing the rejections for obviousness.

[13] Of course the reason that the Office Action fails to establish that Kevasan teaches or suggests a virtual cluster is that Kevasan does not, in fact, disclose a virtual cluster. Kevasan discloses testing rather than simulation. The computing nodes and storage devices involved in the testing are real, not virtual.<sup>[2]</sup>

As per [1], the examiner would like to point out that the examiner relies upon the teaching in Stewart to teach the limitation of “a virtual cluster generator” and “a second (or a first) virtual cluster” while Kevasan is relied upon for a teaching of “a virtual-failure event” and “virtual post failure configuration”.

Regarding to the limitation of “a virtual cluster generator” and “a second (or a first) virtual cluster”, the examiner takes position that Stewart teaches the argued limitation of “a virtual cluster generator” in a simulator (Fig. 1, Element 104) which is coupled to an optimizer (Fig. 1, Element 102), Fig. 2, Col. 3 lines 12-67, and Col. 4 lines 1-5. In particular, the examiner would like to direct attention to where Stewart teaches “an optimizer” which is coupled to a performance simulator that predicts the performance of the resources within a computer system in Col. 3 lines 53-59.

FIG. 1 depicts a computer system configuration optimizer in an embodiment of the present invention. An optimizer 102 is communicatively coupled to a performance simulator 104 that predicts the performance of the resources within a computer system under defined conditions (e.g., topology and workload). In the illustrated embodiment, the conditions are defined by a topology specification and a workload definition (collectively shown as a skeleton configuration 110), which are iteratively processed by the optimizer 102 for input to the performance simulator 104 for each simulation of the optimization. It should be understood that conditions may be specified by different or additional input information in an alternative embodiment of the present invention.

Further, Stewart teaches the argued limitation “a second (or a first) virtual cluster” in Fig. 1, Fig. 3, Col. 3 lines 66-67, Col. 4 lines 1-30, and Col. 5 lines 24-27. In particular, the examiner would like to direct attention to where the prior art teaches “A topology specification” which defines the topological relationships among resources in the computer system configuration in Col. 3 lines 66-67 and Col. 4 lines 1-5. A simulator receives topology data iteratively to simulate the performance of a computer system configuration (Fig. 3 and Col. 5 lines 24-27). “topology data” that a simulator receives for the next simulation iteration corresponds to “a second virtual cluster”.

A topology specification (also called a “resource topology tree<sup>33</sup>”) defines the topological relationships among resources

in the computer system configuration (e.g., number of servers of various types, the number of users connecting to the servers, the communications links between nodes, the communications bandwidth available between nodes, the number of threads executing in a server, etc.). A workload

Regarding the limitation of "a virtual-failure event" and "virtual post failure configuration", the examiner takes the position that Kevasan teaches the argued limitation in Fig. 1 element 165 (test package), Col. 2 lines 54-67, Col. 1 lines 1-2, Col. 4 lines 36-39, Col. 5 lines 12-17, Col. 7 lines 11-24. In particular, the examiner would like to direct attention to where the prior art teaches "test package" in Fig. 1, that corresponds to "a virtual-failure event", which has plurality of test suites which arranged to simulate cluster operation involving various faults scenarios (Col. 2 lines 60-63).

Further, the examiner would like to direct attention to where Kevasan teaches "A configuration file" and "the test results" that corresponds to "virtual post failure configuration" in Col. 7 lines 11-24.

A configuration file is then created for the test administrative machine (step 216), which is copied to each node (step 218). The configuration file includes a complete listing of all of the configuration information that has been obtained, including the names of each of the computing nodes and their associated connection topology, including an indication of how each storage device is coupled to its associated nodes. It also includes an indication of the failure and restore commands.

The tests are then ready to be run according to the configuration of the desired cluster. As the tests are run, the test administrative machine collects information regarding the test results (step 220) and generates a report when testing is complete (step 222).

As per [2], the examiner takes position that Kevasan clearly teaches simulation. In particular the examiner would like to direct attention to where Kevasan states that "simulate cluster operation in both fault and non-fault scenarios" in Col. 1 lines 46-48.

In some embodiments, a common test package is installed on each of the computing nodes in a test system. The test package has a plurality of test suites that are designed to exercise the storage device(s) under different scenarios that simulate events that can occur in a clustered computing environment. The desired test suites are then executed without the computing nodes operating as a cluster. The test package can include any number of test cases. The test cases may be arranged to ~~simulate cluster operations in both fault and non-fault scenarios~~. The fault scenarios may include node fault scenarios, storage fault scenarios and/or multipathing fault scenarios.

Therefore, the examiner takes the position that *Prima Facie* obviousness of a claimed invention has been established as all the claim limitations are taught by Stewart and Kevasan, and it is obvious to combine the teachings of the prior arts.

The rejection should be maintained.

(B). Appellants have argued Group 2; CLAIMS 10-16 that:

[19] However, even if the proposed modification were viable, it would not meet the limitations of Claim 10. Claim 10 requires "generating a second virtual computer cluster in a virtual post-failure configuration that serves as a model for said real computer cluster in said real post- failure configuration." This limitation is not disclosed by either of the cited references.

[20] In particular, neither reference discloses a second virtual computer cluster. The Office Action recognizes that Stewart does not disclose this limitation, but erroneously asserts that Kesavan discloses this limitation. However, Kesavan nowhere discloses a virtual cluster, let alone the second virtual computer cluster in a virtual post-failure configuration..." In any event, the Office Action has failed to identify which element disclosed by Kesavan corresponds to the claimed second virtual computer cluster and thus has failed to establish modifying Stewart in accordance with the teachings of Kesavan would meet the limitations of Claim 10.

The examiner would like to point out that the examiner relies upon the teaching in Stewart to teach the limitation of "generating a second virtual cluster" while Kevasan is relied upon for a teaching of "a virtual post-failure configuration that serves as a model for said real computer cluster in said real post- failure configuration".

Regarding the limitation of “generating a second virtual cluster”, the examiner takes the position that Stewart teaches the argued limitation “generating a second virtual cluster” in Fig. 1, Fig. 3, Col. 3 lines 66-67, Col. 4 lines 1-30, and Col. 5 lines 24-27. In particular, the examiner would like to direct attention to where the prior art teaches “A topology specification” which defines the topological relationships among resources in the computer system configuration in Col. 3 lines 66-67 and Col. 4 lines 1-5. A simulator receives topology data iteratively to simulate the performance of a computer system configuration (Fig. 3 and Col. 5 lines 24-27). Receiving “topology data” for the next simulation iteration corresponds to “generating a second virtual cluster”.

A topology specification (also called a “resource topology tree”) defines the topological relationships among resources in the computer system configuration (e.g., number of servers of various types, the number of users connecting to the servers, the communication links between nodes, the communication bandwidth available between nodes, the number of threads executing in a server, etc.). A workload

Regarding the limitation of “a virtual post-failure configuration that serves as a model for said real computer cluster in said real post- failure configuration”, the examiner would like to direct attention to where Kevasan teaches “A configuration file” and “the test results” that corresponds to “a virtual post-failure configuration that serves as a model for said real computer cluster in said real post- failure configuration” in Col. 7 lines 11-24.

A configuration file is then created for the test administrative machine (step 216), which is copied to each node (step 218). The configuration file includes a complete listing of all of the configuration information that has been obtained, including the names of each of the computing nodes and their associated connection topology, including an indication of how each storage device is coupled to its associated nodes. It also includes an indication of the failure and restore commands.

The tests are then ready to be run according to the configuration of the desired cluster. As the tests are run, the test administrative machine collects information regarding the test results (step 220) and generates a report when testing is complete (step 222).

Therefore, the examiner takes the position that *Prima Facie* obviousness of a claimed invention has been established as all the claim limitations are taught by Stewart and Kevansan, and it is obvious to modify the teaching of Stewart according to Kesavan.

The rejection should be maintained.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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